



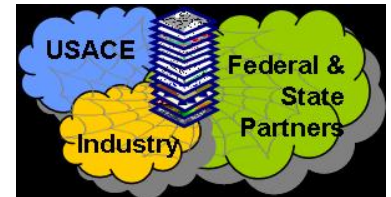
**US Army Corps
of Engineers®**

Engineer Research and
Development Center

The U.S. Army Corps of Engineers DataNet

Technology

The DataNet was established to allow USACE software developers (those who build computational models, GIS applications, Web applications, etc.) to efficiently access such heterogeneous data sources as the National Oceanic and Atmospheric Administration (NOAA) Tidal Data, U.S. Geological Survey (USGS) Historic Stream Flow data, NOAA Historic Monthly Precipitation data, etc., as well as data manipulation functions (formatting, coordinate conversion, etc.). The DataNet is composed of callable programs or software components called Web Services. A Service Registry provides a Web-accessible catalog of the DataNet services, metadata describing the data delivered by a selected service, and guidance for using the service.



Problem

USACE relies on interactive computer-based systems to identify and assess alternatives, make decisions, and solve problems. The principal component of the decision-making process is data. Data required to support USACE decision making are available from both internal and external sources. External sources include other Federal agencies such as USGS, U.S. Department of Agriculture (USDA), NOAA, National Aeronautics and Space Administration (NASA), as well as private industry and academia. Acquisition of these data is often accomplished via ftp, http, or CD, and results in inefficient and inconsistent use of the data sources. Moreover, data are provided in a myriad of disparate formats and structures while the models and assessment tools that consume these data require differing formats as well. The efficient handling of data is critical in making appropriate as well as timely, cost-effective decisions. There is clearly a problem when a scientist must spend more time acquiring, manipulating, transforming, and organizing data than analyzing those data.

For example, the NOAA National Climatic Data Center (NCDC) provides historical monthly precipitation data for all U.S. cooperative and National Weather Service stations. These data are commonly used by the engineering, operations, and planning communities for hydrologic predictions and water quality modeling. While you can manually search the NCDC Web site, download these data, and then reformat, reorganize, etc., for input to your applications, the DataNet Web Service automates that process. Your application simply makes a call to the Web Service to acquire the data for a given geographic location, and the Service performs the acquisition and returns the requested data to the application. Your application does not need to understand how that service is actually implemented or executed; it just needs to know how to call the service, i.e. understand the service's interface. Many different applications can make calls to this DataNet Web Service.

Expected Cost To Implement

While access to the DataNet is free to USACE software developers and partnering organizations, costs to implement this technology are dependent on the level of expertise of the software developers. Use of this technology requires knowledge in object-oriented programming as well as proficiency in a programming language that supports WSDL to object creation, such as Java, C#.net, or VB.net. Vendors offer Integrated Development Environments (IDE), such as Java netBeans and Microsoft Visual Studio.net, that facilitate application development. Java netBeans is available free from

<http://www.netbeans.org/downloads/index.html> while Microsoft Visual Studio.net is available at <http://msdn.microsoft.com/howtobuy/vstudio/vstudiose/default.aspx> for \$799.

Benefits/Savings

The DataNet provides a standards-based, cross-platform Web-centric framework that allows software developers the capability to use heterogeneous operating systems and development environments.

The DataNet is consistent with the basic guiding principles of data management by providing a solution that avoids duplication in data acquisition; facilitates the sharing of data, both internal and external, via networks and partnerships; adheres to standards; promotes owner-level management and service level agreements; requires metadata for data and services; and is accessible by distributed, heterogeneous applications.

The DataNet reduces the time users typically spend locating, acquiring, manipulating, and organizing data. Several client applications have already embraced the DataNet as a source for data acquisition and delivery, including a desktop browsing application, an extension to a commercial software product (ArcGIS), and a legacy hydrological modeling system (Watershed Modeling System). Each of these applications consumes the Web services connected to the DataNet to support some of its data requirements. These applications represent three very different environments that require access to the same data sources. In all three applications, the time required to acquire and format model-ready data for a 100- × 100-km area of interest was minutes rather than hours. Because access to these data sources was available as a standard Web service via the DataNet, the software developers for all three applications were able to provide increased functionality, programmatically, that drastically reduced the time that users previously spent locating, acquiring, and managing data.

Status

The DataNet has been operational since 2004. Services include:

- USGS national elevation data (NED)
- NOAA estuarine bathymetry
- University of Utah MesoWest precipitation/weather
- METAR current surface conditions
- NCDC NOAA historic monthly precipitation
- USGS real-time stream flow
- USGS historic stream flow
- NOAA tidal data
- USACE national inventory of dams
- USGS land use/land cover data
- USDA STATSGO
- USEPA STORET
- USGS space shuttle radar topo maps

ERDC POC

James Stinson, Ken Pathak

Distribution Sources

Currently, thirteen DataNet Web services are available via the Service Registry, located on-line at <https://swwrp.usace.army.mil> under the Toolbox tab.

Access to the Toolbox requires login with a valid userid and password. USACE users should use their UPASS userid and remote password. Non-USACE users should contact Ken Pathak at Ken.Pathak@erdc.usace.army.mil to request access. As new services are developed and approved for use, they will be added to the Service Registry.

Available Documentation

Technical Notes describing the development and use of DataNet services are available at <https://swwrp.usace.army.mil> under the **Publications** tab, **Unifying Technologies** option.

Available Support and Training

Workshops and/or Web-based Live Meetings can be scheduled by contacting Ken Pathak at Ken.Pathak@erdc.usace.army.mil

